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Fax Cover Sheet

Date: 03 Oct 2002

To: Lee J. Fleckenstein	**From:** Elena Tsoy
Application/Control Number: 09/608,818	**Art Unit:** 1762
Fax No.: 585-262-4133	**Phone No.:** (703) 605-1171
Voice No.:	**Return Fax No.:** (703) 872-9310
Re:	**CC:**

☐ **Urgent** ☐ **For Review** ☐ **For Comment** ☐ **For Reply** ☐ **Per Your Request**

Comments:

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Number of pages 2 including this page

JAECKLE FLEISCHMANN & MUGEL, LLP
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TAX

To: Examiner Elena Tsoy

Fax Number: (703) 746-7175

From: Lee J. Fleckenstein

Date/Time Sent: Oct 3, 2002

Subject:

Number of Pages: 2 Client/Matter #: [illegible]

Message:

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October 3, 2002

Examiner Elena Tsoy
USPTO
Fax No. (703)746-7175

Dear Examiner Tsoy:

Thank you very much for your effort and cooperation in our extensive discussions of Application Serial No. 09/608,818. I have not yet been able to get in touch with the lead inventor, Jiann Chen, but I would like to call your attention to the following recent patents granted to Dr. Chen, all of which disclose a fluorocarbon thermoplastic random copolymer having thc same ranges of the three fluoromonomers included in the composition of the instant application:

U.S. 6,444,741
U.S. 6,429,249
U.S. 6,419,615
U.S. 6,416,819
U.S. 6,372,833
U.S. 6,361,829
U.S. 6,355,352

Hartley et al., U.S. 4,853,737 is of record in all of these cases except for U.S. 6,419,615.

Thank you again for your willingness to discuss this case with me.

Lee Fleckenstein

JAECKLE FLEISCHMANN & MUGEL, LLP

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TAX

To: Examiner Elana Troy

Fax Number: (703) 746-7175

From: Lee J. Fleckenstein(585) 262-3640

Date/Time Sent: October 3, 2002

Subject:

Number of Pages: 4 Client/Matter #: 000002

Message:

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fluoroelastomers offer better fluid resistance than A type fluoroelastomer. There is a full range of Viton® B grades that accomodate a variety of manufacturing processes including injection and compression molding, extrusion, and calendering.

Viton® F:

Viton® F is a grade of fluoroelastomer terpolymers, that is they are polymerized from three monomers, vinyl fluoride (VF2), hexafluoropropylene (HFP), and tetrafluoroethylene (TFE). Viton® F fluoroelastomers offer the best fluid resistance of all Viton® types. F types are particularly useful in applications requiring resistance to fuel permeation. There is a range of Viton® F grades to accomodate various manufacturing requirements.

High Performance Grade:

Viton® GB, GBL:

Viton® GB and GBL are grades of fluoroelastomer terpolymers, that is they are polymerized from three monomers, vinyl fluoride (VF2), hexafluoropropylene (HFP), and tetrafluoroethylene (TFE). Viton® GB and GBL use peroxide cure chemistry that result in superior resistance to steam, acid, and aggressive engine oils. There is full range of GB and GBL types that can accommodate most rubber processing requirements including compression, injection and transfer molding, extrusion, and calendering.

Viton® GLT:

Viton® GLT is a fluoroelastomer designed to retain the high heat and the chemical resistance of general use grades of Viton® fluoroelastomer, while improving the low temperature flexibility of the material. Glass transition temperatures (Tg) of materials are indicative of low temperature performance in typical elastomer applications. Viton® GLT shows an 8 to 12°C lower Tg than general use Viton® grades. There is a range of GLT products to accommodate various processing conditions.

Viton® GFLT:

Viton® GFLT is a fluoroelastomer designed to retain the high heat and the superior chemical resistance of the GF High Performance types, while improving the low temperature performance of the material. Viton® GFLT shows a 6 to 10°C lower Tg than general use Viton® grades. There is a range of GFLT products to accommodate various processing conditions.

Key: 1=Excellent, 2=Very Good, 3=Good, NR=Not Recommended

Relative Chemical Compatibility and Mechanical Properties of Viton® Fluoroelastomers

	Viton®—General Use Grade Types			Viton®—High-Performance Grade Types			
Chemical Environment	**A**	**B**	**F**	**GB, GBL**	**GF**	**GLT**	**GFLT**
Automotive and aviation fuels	1	1	1	1	1	1	1
Automotive fuels oxygenated with MEOH, ETOH, MTBE, etc.	NR	2	1	2	1	NR	1
Engine lubricating oil, SE and SF	2	1	1	1	1	1	1
Engine lubricating oil, SG and SH	3	2	1	1	1	2	1
Aliphatic hydrocarbon process fluids, chemicals	1	1	1	1	1	1	1
Aromatic hydrocarbon process fluids, chemicals	2	2	1	1	1	2	1
Aqueous fluids, steam, mineral acids	3	2	2	1	1	1	1
Compression and low-temperature performance							
Resistance to compression set	1	2	2	2	3	2	2
Low-temperature flexibility	2	2	3	2	3	1	1

Viton® is a registered trademark of Dupont Dow Elastomer

MADE WITH GENUINE VITON
DuPont Dow Elastomers VITON

NQA ISO9002 REGISTERED COMPANY

PSP Inc.
Problem Solving Products, Inc.

- home
- o-rings and seals
  - products
  - AS568A sizes
  - materials chart
  - Aegis
  - Kalrez®
  - Viton grades
  - industries
- plastic components
- quality policy
- ramblings
- news releases
- e-mail

Comparison of Dupont Dow Viton® Fluoroelastomers

There are three major general use grades of Viton® fluoroelastomer: A, B and F. They differ primarily in their resistance to fluids, and in particular aggressive lubricating oils and oxygenated fuels, such as methanol and ethanol automotive fuel blends. There is also a class of high performance Viton® grades: GB, GBL, GP, GLT, and GFLT.

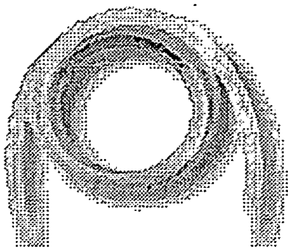
General Use Grades:

Viton® A: (vinylidene fluoride and hexafluoropropylene)

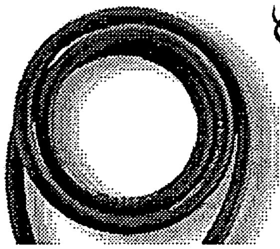
Viton® A is a family of fluoroelastomer dipolymers, that is they are polymerized from two monomers, vinylidene fluoride (VF2) and hexafluoropropylene (HFP). Viton® A fluoroelastomers are general purpose types that are suited for general molded goods such as o-rings and v-rings, gaskets, and other simple and complex shapes. There is a full range of Viton® A grades that accomodate various manufacturing processes including transfer and injection molding, extrusion, compression molding, and calendering.

Viton® B: (vinylidene, hexafluoropropylene and tetrafluoroethylene)

Viton® B is a grade of fluoroelastomer terpolymers, that is they are polymerized from three monomers, vinylidene (VF2), hexafluoropropylene (HFP), and tetrafluoroethylene (TFE). Viton® B



- Excellent bio-compatibility
- Practically no segregation of platicizers and additives
- Ideal for low temperatures
- Waterproof
- Resistant to ozone, radiation and sun light
- Does not deform
- Silicon peroxide; hot vulcanized
- Temperature range: -50 °C to +230 °C
- Material: Polydimethyl siloxane with siliceous earth and silicon additives, translucent white. Excellent resistance to initial pressure
- Cleaning/sterilization: Clean with hot water and suds, do not use detergents, rinse with destilled water
- Restriction: Not suitable for concentrated solvents, oils, acids or dilute caustic soda. Relatively high permeability to gas
- For tube sizes please refer to tubing selection table



Viton ®

- Highly resistant to chemicals
- Excellent resistance to corrosive media, solvents and oils at high temperatures
- Slightly permeable to gas
- Temperature range: -30 °C to +200 °C
- Material: Fluorocarbon rubber, thermoformed Viton B (67 % fluorinated), opaque black
- Cleaning/sterilization: Can be sterilized at 249 °C for a period of 16 hours in a circulating air heating cabinet
- Restriction: Limited life
- For tube sizes please refer to tubing selection table

Styrene - butadiene

SBR

thermocouple. (thermoelectric thermometer). An instrument composed of two wires made of dissimilar metals or semiconducting materials that are joined at one end (the measuring junction), the other end being the reference junction, which is maintained at a known temperature (usually 0C). The difference in temperature between the measuring junction and the reference junction generates an electromotive force that is proportional to the temperature difference. Thermocouples are applicable over a range of −200C to 1800C. The most suitable conducting materials are iron-constantan, platinum-platinum-rhodium, copper-constantan, and Chromel-Alumel; graphite-silicon carbide is used in the metallurgical field. Thermocouples are essential for determinations of extreme temperatures that are beyond the range of liquid-in-glass thermometers. Their industrial applications include molten metals, fuel beds, ceramic kilns, furnaces, etc.; in laboratories they are used for both high-temperature and cryogenic research. They are also applicable to intermediate temperatures in cases where conventional thermometers are impracticable.
See thermoelectricity.

thermodynamic potential. See Nernst potential.

thermodynamics. A rigorously mathematical analysis of energy relationships (heat, work, temperature, and equilibrium), the principles of which were first elaborated by J. Willard Gibbs in the mid-19th century. It describes systems whose states are determined by thermal parameters, such as temperature, in addition to mechanical and electromagnetic parameters. A *system* is a geometric section of the universe, whose boundaries may be fixed or varied, and that may contain matter or energy or both. The *state* of a system is a reproducible condition, defined by assigning fixed numerical values to the measurable attributes of the system. These attributes may be wholly reproduced as soon as a fraction of them has been reproduced. In this case the fractional number of attributes determines the state, and is referred to as the *number of variables of state* or *the number of degrees of freedom* of the system.

The concept of *temperature* can be evolved as soon as a means is available for determining when a body is "hotter" or "colder." Such means might involve the measurement of a physical parameter such as the volume of a given mass of the body. When a "hotter" body, A, is placed in contact with a "colder" body, B, it is observed that A becomes "colder" and B "hotter." When no further changes occur, and the joint system involving the two bodies has come to equilibrium, the two bodies are said to have the same temperature. Thus temperature can only be measured at equilibrium. Therefore thermodynamics is a science of equilibrium, and a thermodynamic state is necessarily an equilibrium state. Thermodynamics is a macroscopic discipline, dealing only with the properties of matter and energy in bulk, and does not recognize atomic and molecular structure. Although severely limited in this respect, it has the advantage of being completely insensitive to any change in our ideas concerning molecular phenomena, so that its laws have broad and permanent generality. Its chief service is to provide mathematical relations among the measurable parameters of a system in equilibrium so that, for example, a variable like pressure may be computed when the temperature is known, and vice versa.

thermodynamics, chemical. See chemical thermodynamics.

thermoelectricity. Electricity produced directly by applying a temperature difference to various parts of electrically conducting or semiconducting materials. Usually two dissimilar materials are used, and the points of contact are kept at different temperatures (Peltier effect). Many temperature-measuring devices (thermocouples, thermopiles) work on this principle, since the voltage is proportional to the temperature difference. Metallic conductors are usually used for these "thermometers," which produce a rather small current. A newer use for the effect is as a source of electrical energy, i.e., a means of direct conversion of heat into electricity (or vice versa) without the use of a generator (or motor). The materials used for these thermoelectric couples are semiconductors (e.g., tellurium; zinc antimonide; lead, bismuth, and germanium tellurides; samarium sulfide) or thermoelectric alloys, all of which produce relatively large currents. Several of these "cells" are then hooked in series much like the cells of a battery.

"Thermoflex" A *[Du Pont].* TM for a rubber antioxidant containing 25% di-*p*-methoxydiphenylamine $(CH_3OC_6H_4)_2NH$; 25% diphenyl-*p*-phenylenediamine $C_6H_4(NHC_6H_5)_2$; and 50% phenyl-*β*-naphthylamine $C_{10}H_7NHC_6H_5$.
Properties: Dark-gray pellets. D 1.21, fp above 67C.
Use: Tire carcasses, transmission belts, etc., to promote resistance to flexing at operating temperatures.
See antioxidant.

thermofor. A heat-transfer medium.
See coolant.

thermoforming. (1) See reforming. (2) Forming or shaping a thermoplastic sheet by heating the sheet above its melting point, fitting it along the contours of a mold with pressure supplied by vacuum or other force, and removing it from the mold after cooling below its softening point. The method is applied to polystyrenes, acrylics, vinyls, polyolefins, cellulosics, etc.